Trend Study 6-5-01

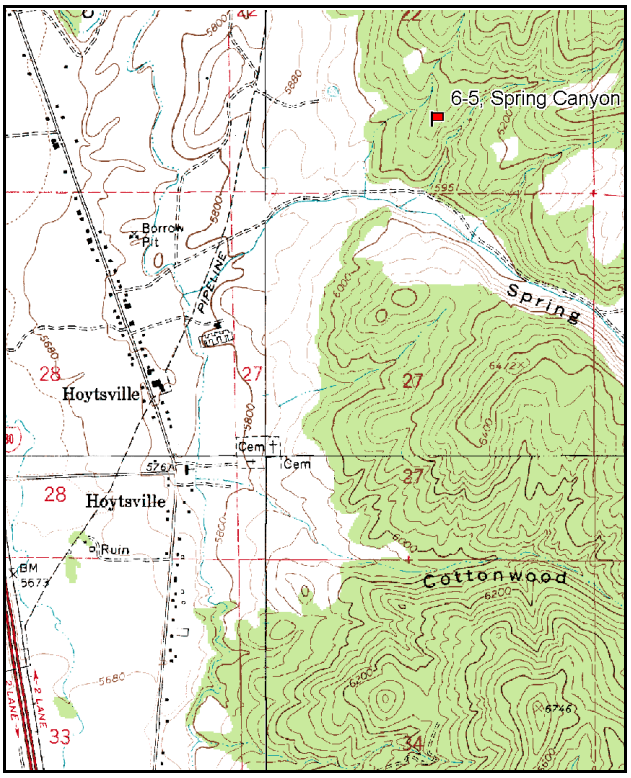
Study site name: Spring Canyon . Vegetation type: Juniper .

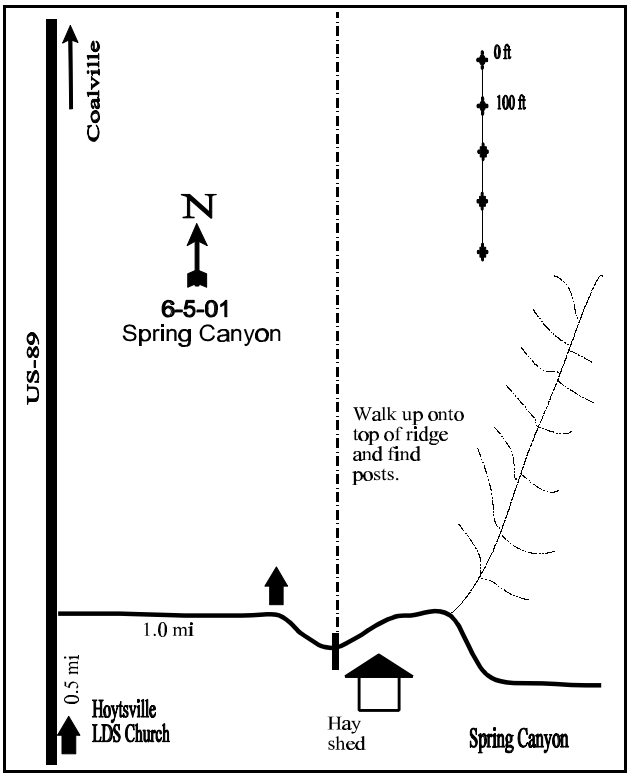
Compass bearing: frequency baseline 165 degrees magnetic.

Frequency belt placement: Line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the LDS Church in Hoytsville, travel north 0.5 miles on old U.S. 189. At 0.5 miles note a dirt road to the right with a sign "Echo-Chalk Creek Range Owners Protective Association" and turn right (east). Proceed 1.0 miles to a gate and a sharp bend to the right (south). Walk to the north side of the road to a north/south running fence. From here walk north along the fence to the 40th metal fence post. From post #40 walk 35 paces at 73 degrees true to the 400-foot baseline stake. The 0-foot stake is marked with browse tag #7953.





Map Name: Turner Hollow

Diagrammatic Sketch

Township 2N , Range 5E , Section 22

UTM 4526183 N 469139 E

DISCUSSION

Trend Study No. 6-5

The Spring Canyon study is located on a juniper covered ridge immediately east of Hoytsville and north of the mouth of Spring Canyon. The study area lies on south-facing slopes that seldom exceed 15%. The area is considered critical deer winter range and is occupied by a closed and relatively unproductive Utah juniper community. The juniper type is very uniform in this area and characterized by a moderately dense stand of uneven-aged juniper. Animal use has been heavy on the site and includes sheep, deer, and elk. Domestic sheep were on the area in late-August of 1984 when the study was initiated. Deer pellet groups have been high in all sampled years. Nine winter-killed deer were observed in the immediate vicinity in 1984. Utilization of available forage has usually approached 100% in the past. Browsing has often extended into 3-year, 4-year, and even older wood on mountain big sagebrush, true mountain mahogany, and juniper. Few preferred shrubs are found on the site anymore. A pellet group transect read on the site in 2001 estimated 58 deer days use/acre (144 ddu/ha) and less than 1 cow day use/acre (2 cdu/ha). Numerous game trails also traverse the site.

Soils on the site have a clay loam texture, and are neutral soil reaction (7.3 pH). The soil surface is rocky and the profile is also moderately stony. Effective rooting depth was estimated at just over 12 inches in 1996. Average soil temperature at 12 inches in depth was estimated at over 70˚ F. Soil temperatures this high tend to make the soil dry for long periods during the summer, making it more difficult for perennial grasses and young shrubs to become established on the site. Thus, high soil temperatures tend to favor winter annuals like cheatgrass. The erosion hazard is moderately high because of poor understory cover and low permeability. In 2001, the level of erosion ranges from slight to moderate on the site. Vegetation cover is low at only 18% in 2001. Litter was moderate (40%), but much of the litter is provided by dead juniper leaves. Cryptogams are moderately abundant (14% in 2001), which provide additional important protective cover in the absence of herbaceous vegetation.

Other than juniper, shrubs and trees are rare. Browse species consists basically of broom snakeweed, prickly pear cactus, and a few snowberry. Utah juniper is the dominant species which provides little forage. Nearly all of the juniper trees have received use over the years as evidenced by past highlining. Juniper canopy cover was estimated at 37% in 2001.

The herbaceous understory is sparse and is not an important source of cover or forage. Native perennial grasses are somewhat abundant in the more open areas, but are infrequent where the juniper overstory is dense. Bluebunch wheatgrass, Indian ricegrass, Sandberg bluegrass, squirreltail, and needle-and-thread have all been sampled on the site. Perennial grasses provided only 5% average cover in 1996 and 2001. Cheatgrass is also present, but has not reached a dominant level. Forbs consist mostly of annual and/or low-growing perennials that provide very little cover or forage. A chaining and seeding project is likely the only type of treatment that could increase vegetative diversity and production on this site.

1984 APPARENT TREND ASSESSMENT

Soil is moderately shallow and inadequately protected from erosion. The current rate of erosion is moderately high and will continue to be so. Trend appears down. Vegetative trend appears to be marginally down. It is categorized as “marginally down" only because it is difficult to imagine conditions being much worse than they currently are. Plant composition shows little evidence of significant change beyond the continuing decline of all palatable browse species, and possibly a small increase in density, cover, and production of perennial grasses. Utah juniper will likely become even more dominant than it is now. Very heavy use in the past seven years, especially the last two, has adversely affected long-term forage production potential of the

site as well as the further depletion of shrub diversity. Of particular concern is the "highlining" of juniper which formerly provided an "emergency" forage source.

1990 TREND ASSESSMENT

Unfortunately, this depleted juniper range type is representative of a majority of winter range in the area above Hoytsville. There is very little browse forage available. The steeper slopes and west exposures support a variety of browse species, but all occur in low densities, are heavily hedged, and mostly decadent. All juniper trees are highlined. Notably, bluebunch wheatgrass decreased in nested frequency while Indian ricegrass frequency was almost unchanged. These plants show evidence of recent grazing. The highly erodible soil is exposed except for the dense litter under the junipers.

TREND ASSESSMENT
soil - slightly downward (2)
browse - down (1)
herbaceous understory - down (1)

1996 TREND ASSESSMENT

This site has the lowest herbaceous cover of all the sites within management unit 6 at only 8%. This doesn't allow for very much protective cover. Percent bare ground actually increased since 1990. Trend for soil is slightly down and in poor condition. The browse trend remains down, with no preferred browse being sampled within the study area. Trend for the herbaceous understory is stable for perennial species, but it still is in very poor condition contributing only 8% cover.

TREND ASSESSMENT
soil - slightly down and in poor condition (2)
browse - down, most preferred browse is gone (1)
herbaceous understory - stable for perennial species, but still not enough cover to protect the soil (3)

2001 TREND ASSESSMENT

Trend for soil is stable. Herbaceous vegetation remains low, but litter cover is stable and cryptogamic cover increased from 3% to 14%. Bare soil remains high, but only slightly increased since 1996. Trend for browse remains down. As in previous readings, palatable, preferred browse forage is nearly nonexistent on the site. Trend for the herbaceous understory is stable, but remains in poor condition. Perennial grasses are in low abundance and forbs are insignificant. Due to the vegetative characteristics of the site at the present time, this site is really only useful as thermal cover and as a travel corridor for wildlife. A chaining and seeding project is likely the only treatment that could increase vegetative diversity and production in the area.

TREND ASSESSMENT
soil - stable (3)
browse - down (1)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 06 , Study no: 5

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'84	'90	'96	'01	'84	'90	'96	'01	'96	'01
G	Agropyron spicatum	$_{b}$59	$_{a}$32	$_{ab}$44	$_{ab}$53	31	13	20	23	.59	1.43
G	Bromus tectorum (a)	-	-	$_{b}$129	$_{a}$103	-	-	48	44	2.82	.42
G	Oryzopsis hymenoides	68	66	78	85	34	31	36	42	1.08	1.62
G	Poa pratensis	3	-	-	-	2	-	-	-	-	-
G	Poa secunda	$_{a}$13	$_{b}$56	$_{ab}$47	$_{b}$54	7	28	17	22	.48	.96
G	Sitanion hystrix	$_{a}$1	$_{b}$34	$_{b}$22	$_{ab}$23	1	18	12	10	.28	.51
G	Stipa comata	$_{b}$13	$_{ab}$27	$_{ab}$29	$_{a}$9	7	13	11	6	.30	.34
Total for Annual Grasses		0	0	129	103	0	0	48	44	2.82	0.42
Total for Perennial Grasses		157	215	220	224	82	103	96	103	2.75	4.86
Total for Grasses		157	215	349	327	82	103	144	147	5.58	5.28
F	Alyssum alyssoides (a)	-	-	239	262	-	-	76	91	1.10	1.05
F	Antennaria rosea	-	6	1	7	-	3	1	3	.00	.04
F	Arabis spp.	-	3	5	-	-	1	3	-	.01	-
F	Astragalus convallarius	4	-	-	-	2	-	-	-	-	-
F	Astragalus utahensis	1	-	2	1	1	-	1	1	.03	.03
F	Camelina microcarpa (a)	-	-	5	2	-	-	2	1	.01	.00
F	Chaenactis douglasii	2	-	-	-	2	-	-	-	-	-
F	Cirsium undulatum	2	-	1	-	2	-	1	-	.03	-
F	Collinsia parviflora (a)	-	-	2	3	-	-	2	1	.01	.00
F	Cryptantha spp.	30	13	21	16	16	8	11	8	.25	.45
F	Cymopterus longipes	-	2	5	3	-	2	4	2	.02	.01
F	Descurainia pinnata (a)	-	-	-	2	-	-	-	1	-	.00
F	Eriogonum umbellatum	7	2	-	-	3	1	-	-	-	-
F	Hackelia patens	-	11	7	6	-	5	4	3	.04	.04
F	Hedysarum boreale	8	-	-	-	5	-	-	-	-	-
F	Machaeranthera canescens	-	-	2	1	-	-	2	1	.01	.00
F	Microsteris gracilis (a)	-	-	$_{b}$-	$_{a}$12	-	-	-	6	-	.05
F	Penstemon humilis	1	5	3	5	1	2	1	3	.03	.01
F	Penstemon spp.	$_{b}$17	$_{a}$-	$_{a}$3	$_{a}$1	7	-	1	1	.03	.00
F	Phlox austromontana	27	20	39	37	12	8	17	18	.66	.82
F	Phlox longifolia	-	-	5	11	-	-	3	4	.01	.02
F	Ranunculus testiculatus (a)	-	-	$_{a}$86	$_{b}$166	-	-	35	61	.27	.97
F	Senecio multilobatus	-	-	2	-	-	-	1	-	.00	-
F	Sisymbrium altissimum (a)	-	-	1	-	-	-	1	-	.00	-

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'84	'90	'96	'01	'84	'90	'96	'01	'96	'01
Total for Annual Forbs		0	0	333	447	0	0	116	161	1.39	2.09
Total for Perennial Forbs		99	62	96	88	51	30	50	44	1.16	1.43
Total for Forbs		99	62	429	535	51	30	166	205	2.56	3.53

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 06 , Study no: 5

Type	Species	Strip Frequency		Average Cover %	
		'96	'01	'96	'01
B	Artemisia tridentata vaseyana	0	1	-	-
B	Gutierrezia sarothrae	6	7	.20	.03
B	Juniperus osteosperma	12	12	16.73	8.39
B	Opuntia spp.	8	11	.22	.05
B	Symphoricarpos oreophilus	1	0	-	-
Total for Browse		27	31	17.15	8.47

CANOPY COVER --
Herd unit 06 , Study no: 5

Species	Percent Cover	
	'96	'01
Juniperus osteosperma	35	37

Point-Quarter Tree Data

Trees per Acre	
'96	'01
159	189

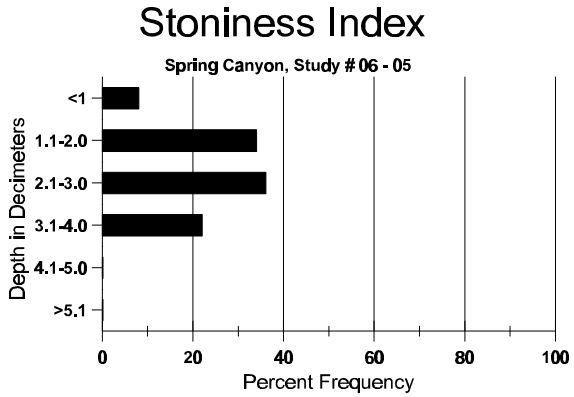
Average diameter (in)	
'96	'01
11.9	17.7

BASIC COVER --
Herd unit 06 , Study no: 5

Cover Type	Nested Frequency		Average Cover %			
	'96	'01	'84	'90	'96	'01
Vegetation	337	321	.50	1.00	25.55	18.48
Rock	129	123	1.75	6.25	2.94	2.79
Pavement	207	201	9.25	12.50	3.84	5.47
Litter	382	331	56.25	48.50	40.31	40.42
Cryptogams	152	206	2.75	5.25	3.52	14.18
Bare Ground	260	251	29.50	26.50	28.08	31.93

SOIL ANALYSIS DATA --
Herd Unit 06, Study no: 05, Spring Canyon

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
12.1	70.2 (11.9)	7.3	32.6	30.7	36.7	2.9	3.8	38.4	.6



PELLET GROUP FREQUENCY --
Herd unit 06 , Study no: 5

Type	Quadrat Frequency '96	Quadrat Frequency '01	Pellet Transect Pellet Groups per Acre 01	Pellet Transect Days Use per Acre (ha) 01
Sheep	2	-	-	-
Rabbit	12	37	339	N/A
Elk	1	1	-	-
Deer	44	22	757	58 (144)
Cattle	-	1	9	1 (2)

BROWSE CHARACTERISTICS --
Herd unit 06 , Study no: 5

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier alnifolia																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	1	-	-	-	-	-	-	-	-	-	-	1	33			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'84	00%	00%	00%
'90	100%	00%	100%
'96	00%	00%	00%
'01	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
'84	0	Dec:	-
'90	33		-
'96	0		-
'01	0		-

Artemisia tridentata vaseyana																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'84	00%	00%	00%
'90	00%	00%	00%
'96	00%	00%	00%
'01	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)			
'84	0	Dec:	-
'90	0		-
'96	0		-
'01	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus viscidiflorus																		
Y	84	-	1	-	-	-	-	-	-	-	1	-	-	-	33			1
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
D	84	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'84	50%	00%	00%
'90	00%	00%	00%
'96	00%	00%	00%
'01	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
'84	66	Dec:	50%
'90	0		0%
'96	0		0%
'01	0		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	01	15	-	-	-	-	-	-	-	-	15	-	-	-	300			15
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	10	-	-	-	-	-	-	-	-	10	-	-	-	200	7	8	10
	01	3	-	-	-	-	-	1	-	-	4	-	-	-	80	5	4	4
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'84	00%	00%	00%
'90	00%	00%	00%
'96	00%	00%	00%
'01	00%	00%	05%

%Change: +40%

Total Plants/Acre (excluding Dead & Seedlings)				
	'84	0	Dec:	0%
	'90	0		0%
	'96	240		0%
	'01	400		5%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	84	-	1	1	-	-	-	-	-	-	2	-	-	-	66			2
	90	-	-	-	-	-	-	1	-	-	1	-	-	-	33			1
	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	84	-	3	3	-	-	-	-	3	-	9	-	-	-	300	67	157	9
	90	1	-	-	-	-	-	4	-	3	8	-	-	-	266	186	153	8
	96	5	-	-	-	-	-	3	3	-	11	-	-	-	220	-	-	11
	01	6	-	-	-	-	-	2	3	-	11	-	-	-	220	-	-	11
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	2	-	-	-	-	-	2	40			2
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	36%	36%	00%	-18%
'90	00%	33%	00%	-13%
'96	00%	00%	00%	+ 7%
'01	00%	00%	14%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'84	366	Dec:	0%
	'90	299		0%
	'96	260		0%
	'01	280		14%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	84	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	90	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	01	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	84	1	-	-	-	-	-	-	-	-	1	-	-	-	33	7	14	1
	90	2	-	-	-	-	-	-	-	-	2	-	-	-	66	5	10	2
	96	8	-	-	-	-	-	-	-	-	8	-	-	-	160	5	12	8
	01	8	-	-	1	-	-	-	-	-	8	1	-	-	180	4	10	9
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	1	-	-	-	-	-	-	-	-	-	-	1	-	33			1
	96	5	-	-	-	-	-	-	-	-	1	-	4	-	100			5
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	+60%
'90	00%	00%	20%	+41%
'96	00%	00%	29%	- 7%
'01	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'84	66	Dec:	0%
	'90	165		20%
	'96	280		36%
	'01	260		8%

Symphoricarpos oreophilus

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7	12	1
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	
'90	00%	00%	00%	
'96	00%	00%	00%	
'01	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'84	0	Dec:	-
	'90	0		-
	'96	20		-
	'01	0		-